



The Future Is Not What It Used To Be

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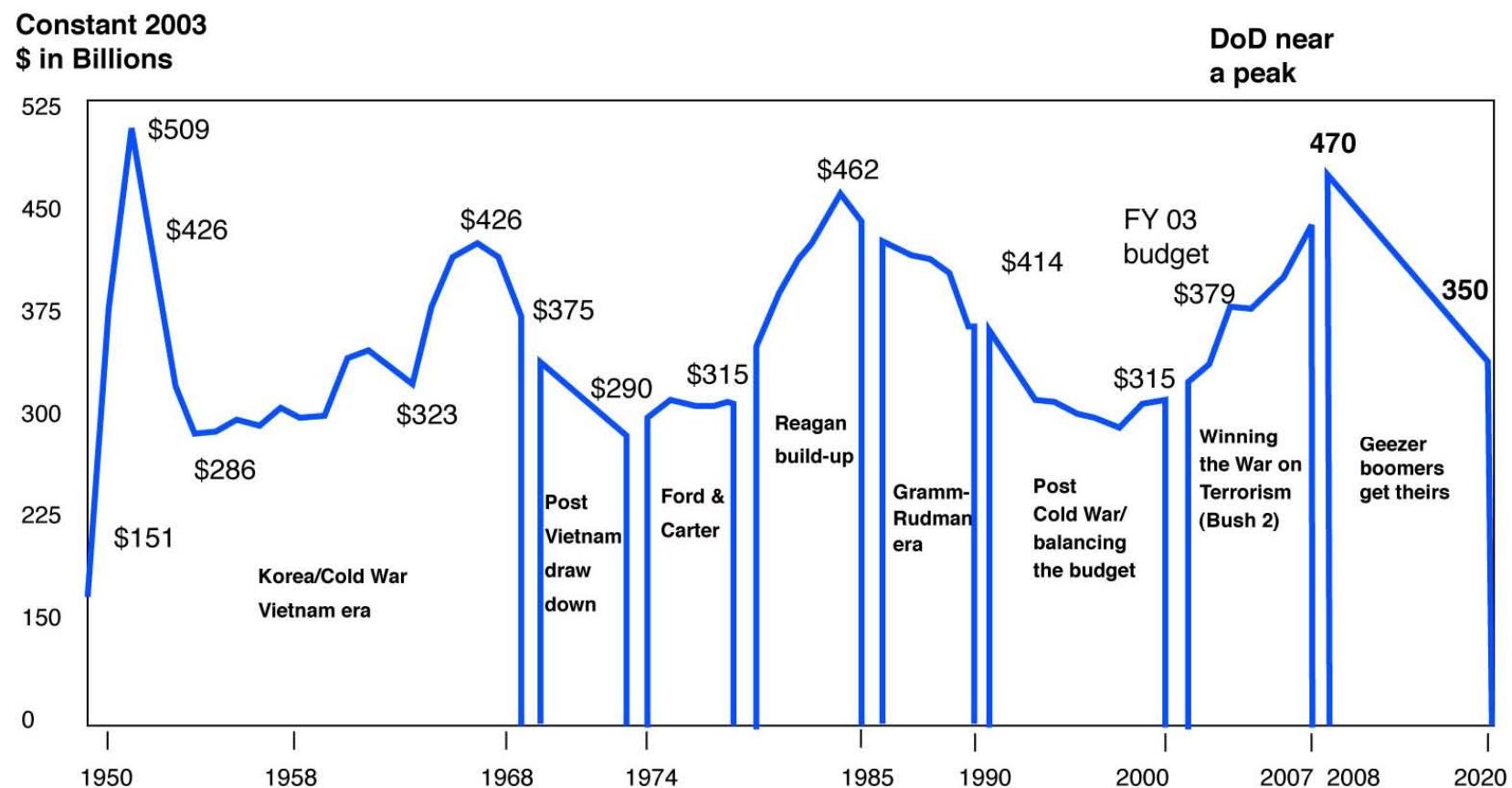


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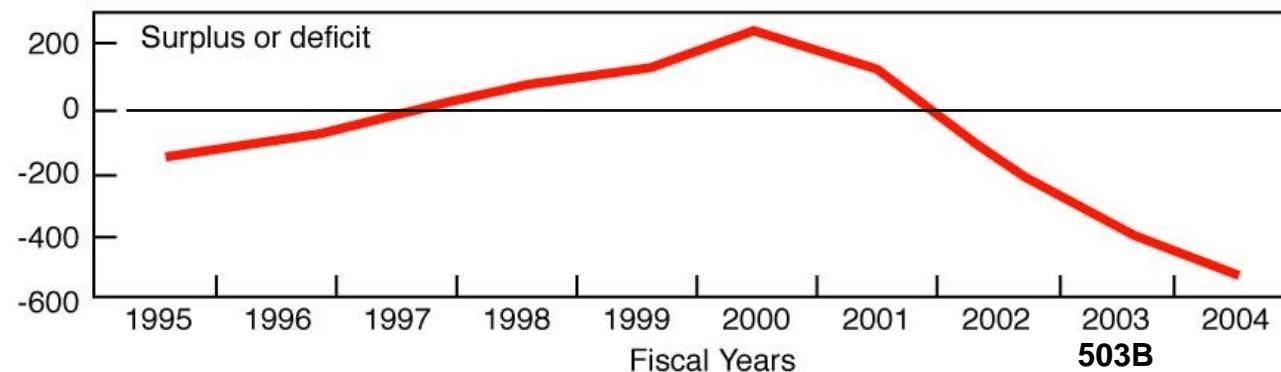
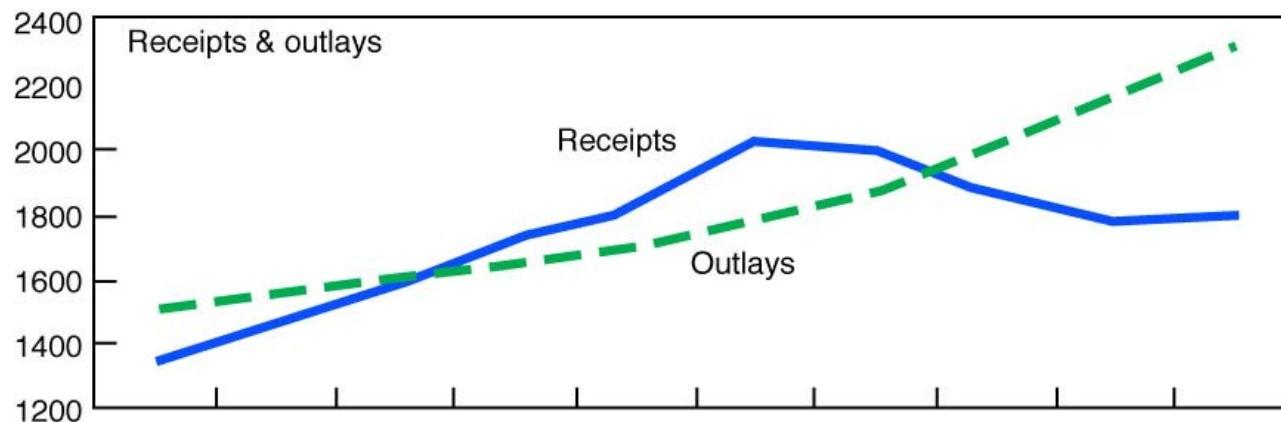
DoD budget authority cycles



DoD funding has a 20-year cycle

Deficit is high and growing

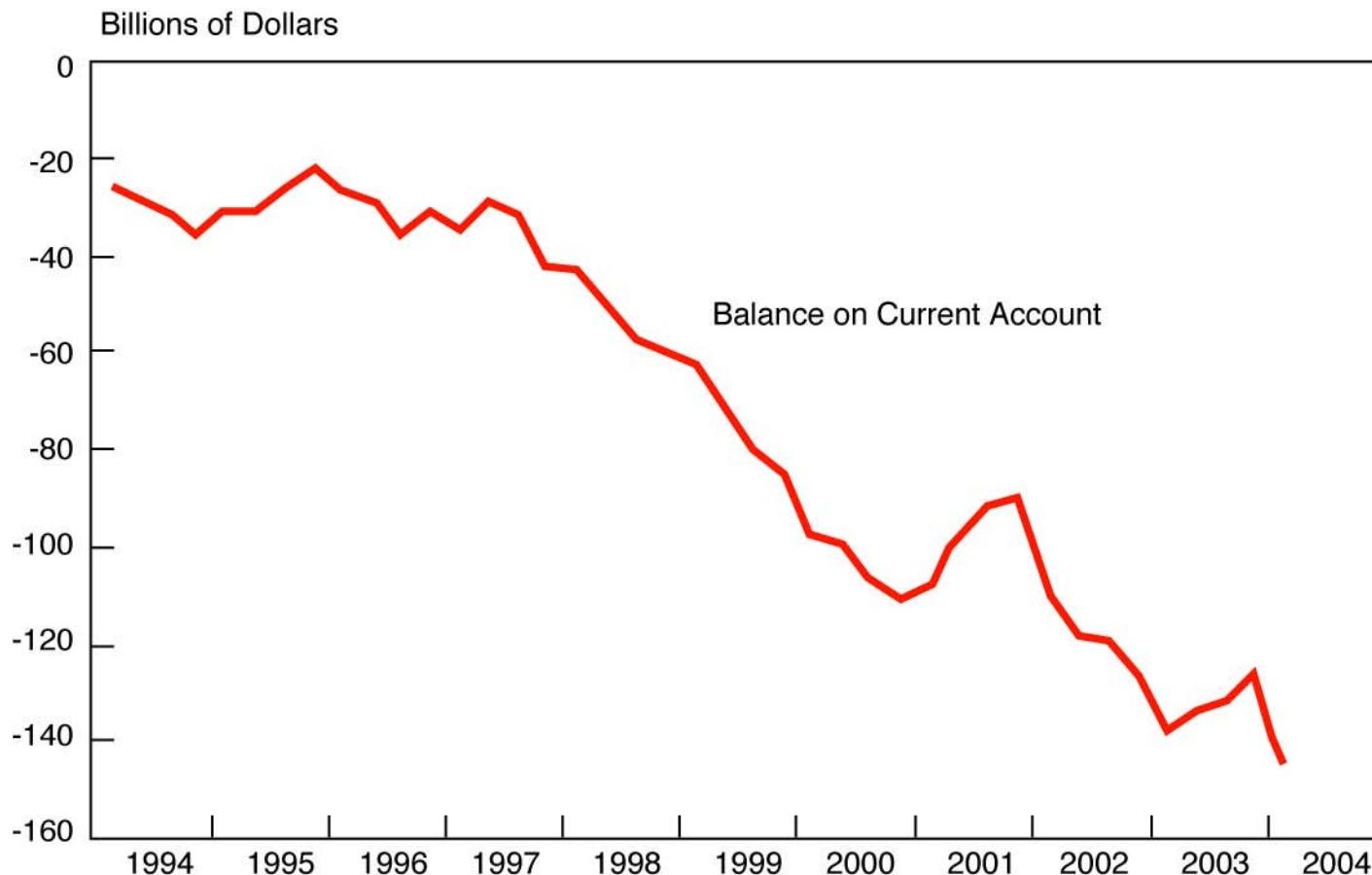
Billions of Dollars



503B

Sources: Department of Treasury & OMB

Foreigners are buying our debt and we buy their stuff

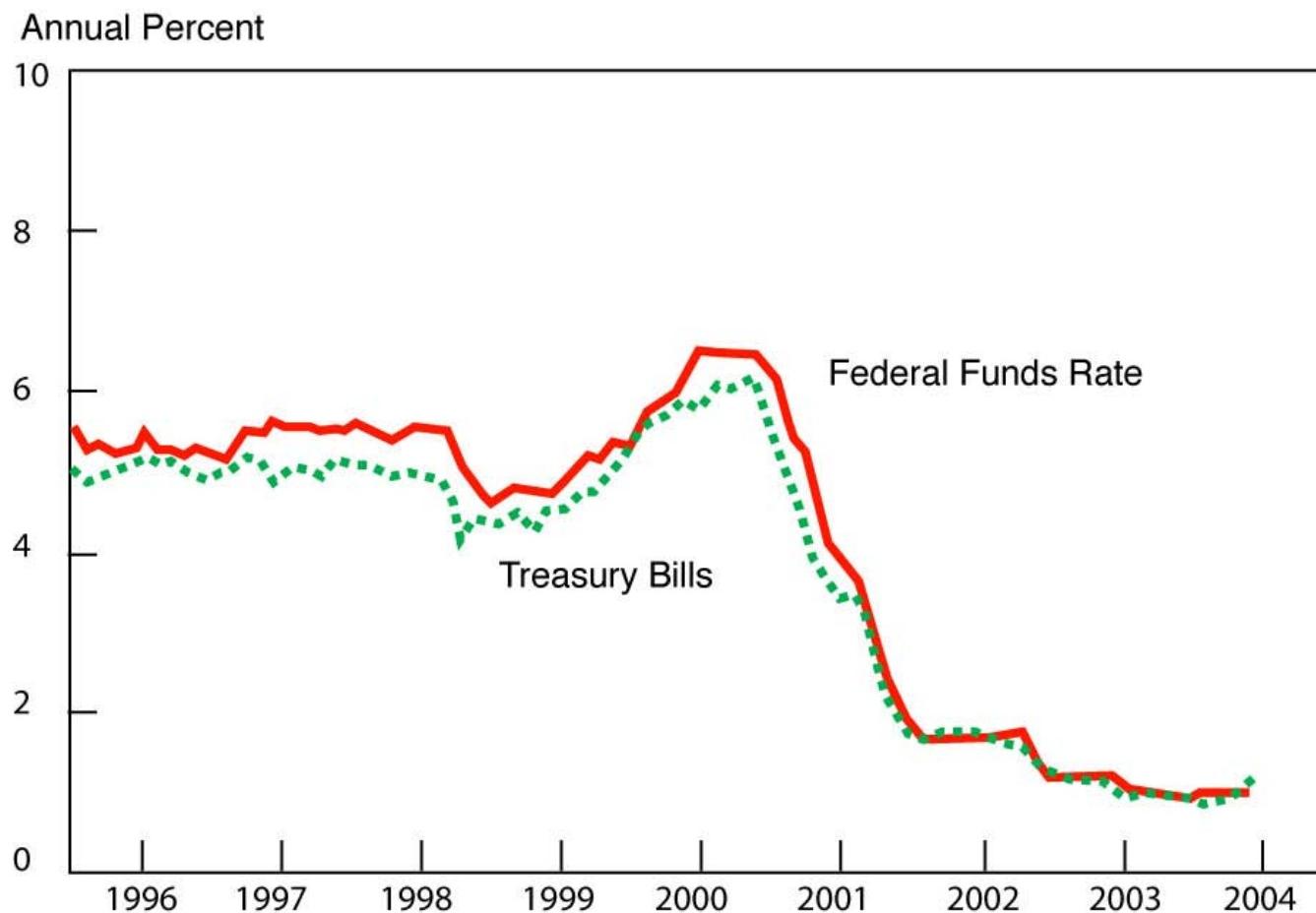


Source: Department of Commerce

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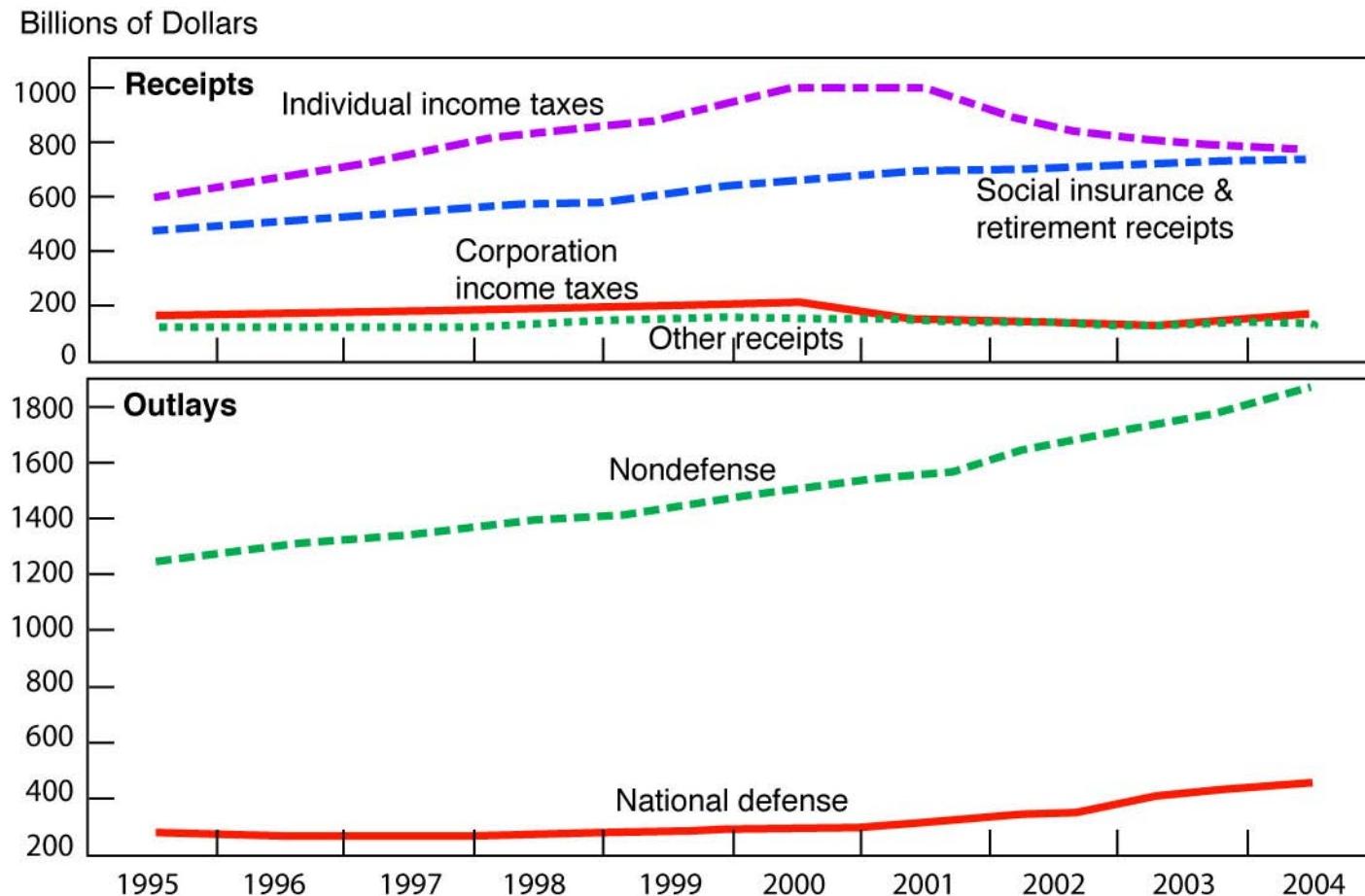
Interest rates are low and will increase



Source: Council of Economic Advisors

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Non-defense* will grow



*(health, Medicaid, income security, social security, interest, other)

Sources: Department of Treasury & OMB

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Technologies from cold war S&T investment

(from OSD DT&E / 03)

Stealth

High performance fighter aircraft, jet engines

Spy satellites

Hypersonics

Terrain matching navigation

High precision navigation

High performance armor

High energy lasers

High power microwave weapons

Advanced signal processing (acoustic & radar)

Advanced simulators

Night vision devices

Synthetic Aperture & MTI Radar

High bandwidth communications

Unbreakable codes

High performance jammers

So what is the plan?

AF -- UAVs -- Robots

Army -- FCS -- Robots

Navy -- guided missiles from subs --
Robots

SOF -- sensor network
assisted humans



How will the nation spend its money on R&D?

- Energy → plentiful, clean, affordable
- Environment → clean, affordable
- Education → available, effective, affordable
- Transportation → clean, safe, affordable
- Manufacturing → flexible, clean, affordable
- Health Care → effective, affordable
- Security → **effective, affordable, preserve civil liberties**

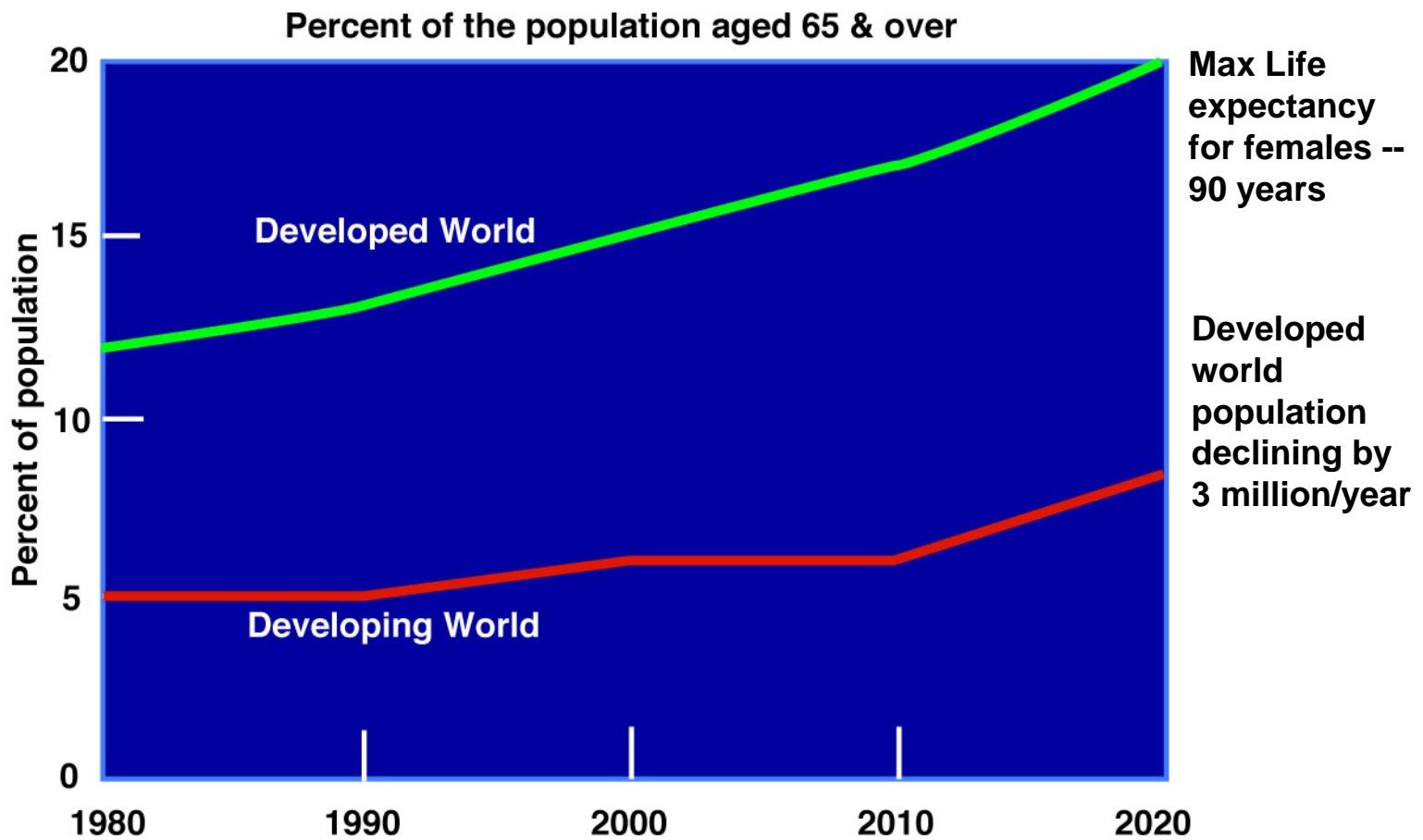


The barriers to affordable solutions are often technical

- Materials
- Computing
- Sensors
- Information technology
- Software
- Manufacturability
- Biotechnology

But, it is also the people, stupid!
or
Is it stupid people?

Demographics point to a major change



Max Life
expectancy
for females --
80 years

Half of people
over 85 have
Alzheimer's

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Population growth & abrupt climate change could place heavy demands on water supplies

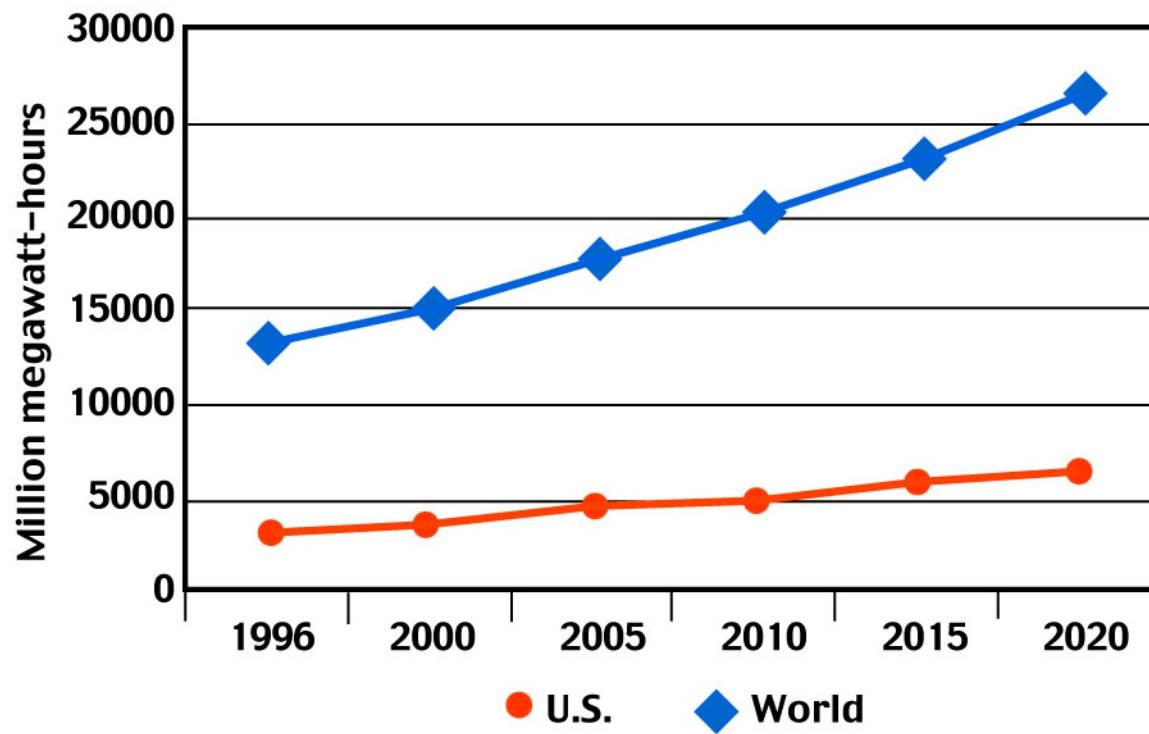
- Biological contaminants are increasing
- Chemicals in water system
- Heavy metals
- Ocean pollution
- Aquifer depletion (in Albuquerque, ~30 feet in 10 years)
- Abrupt climate change?

Water availability is likely to become one of the most pressing and contentious resource issues of this century

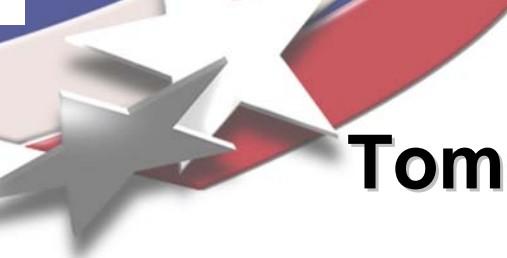
- By the year 2025, 48 countries containing 3 billion people will face fresh water shortages

Source: CIA / DoI / 2001

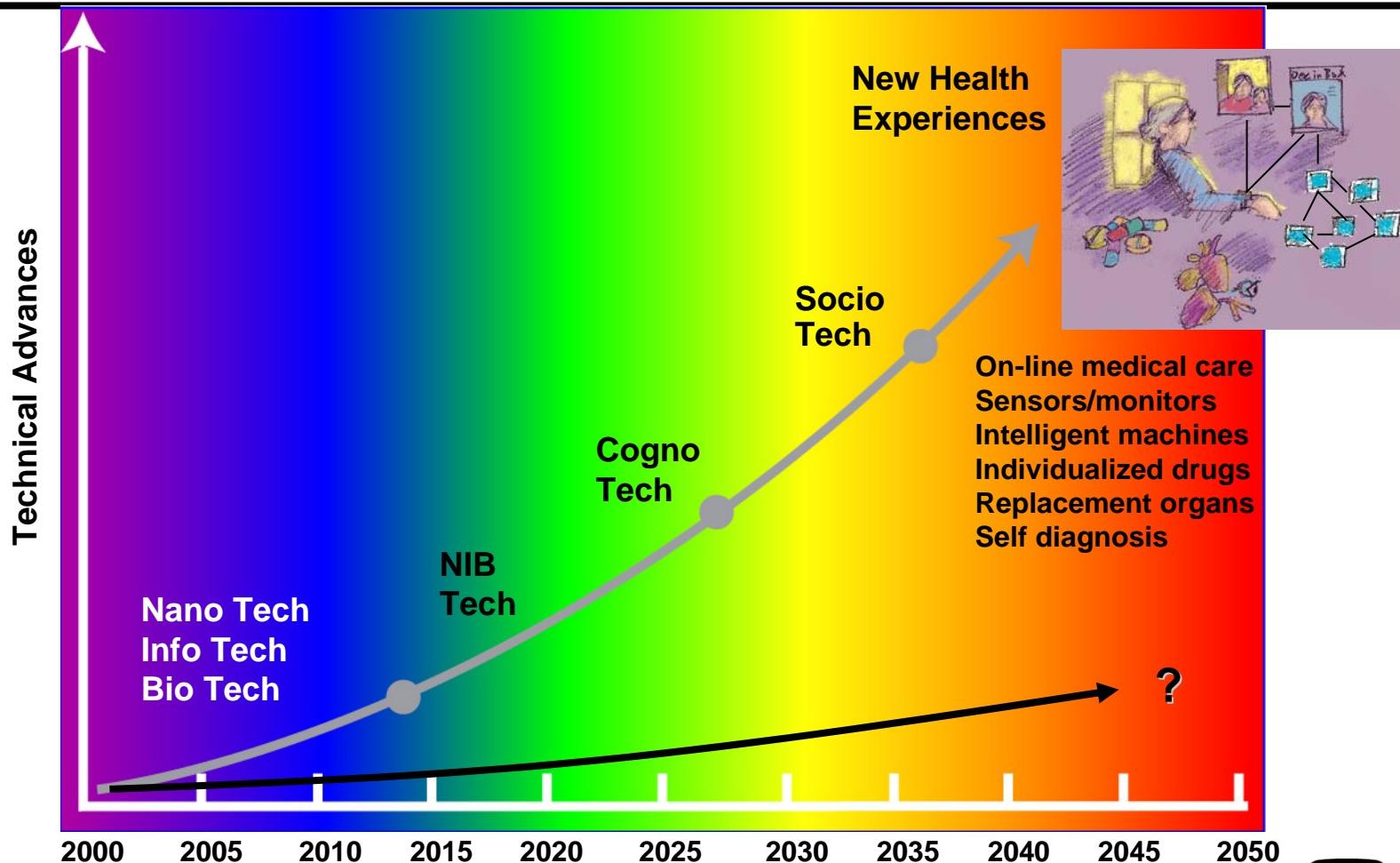
U.S. / world electricity demand



Source: *World Energy Council and EIA projections*



Tomorrow's health care needs will drive tech investments



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The vital issues

- Energy
- Environment (water)
- Education
- Economics
- Transportation
- Health Care

Security

- *Develop a strategic context*
- *Apply a system architecture*
- *Find and kill the terrorists*
- *Win the global war of ideas*



VIDEO

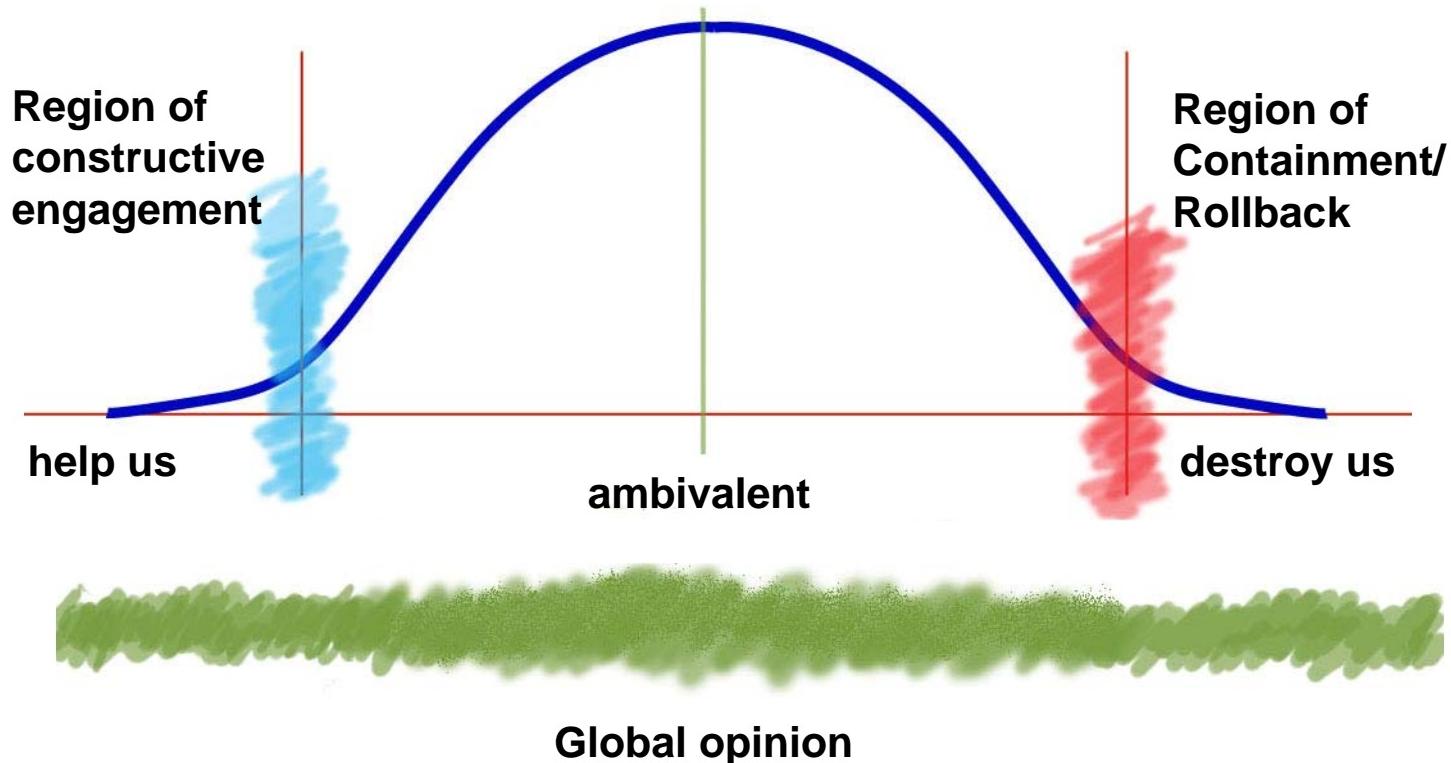


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The Global War Of Ideas (GWOI)



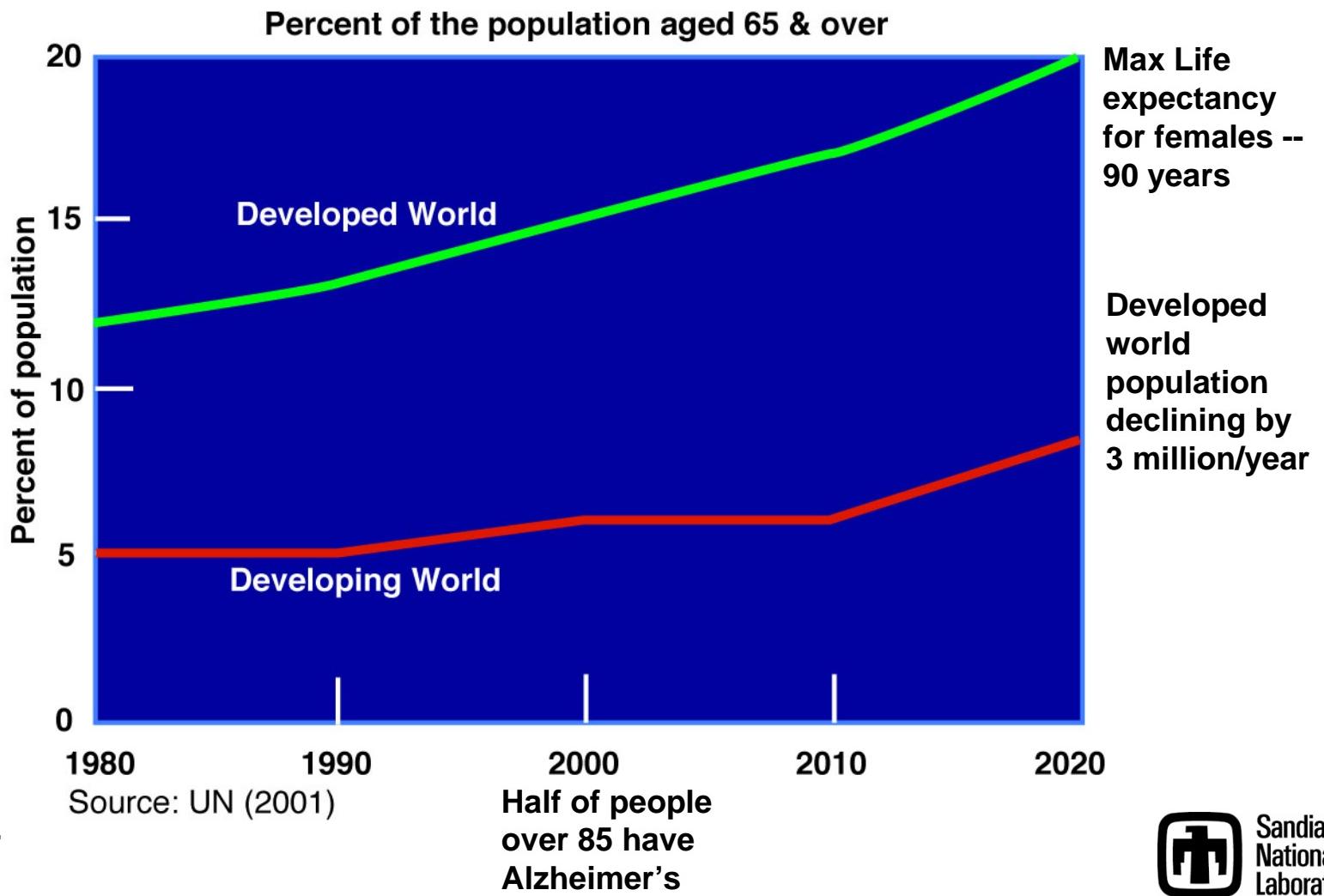
The global war within Islam will be fought on three battlegrounds:
Engagement, Containment/Rollback, Global Opinion



Concepts for GWOI

- **Quantify the distribution: help us -- ambivalent -- destroy us**
- **Targeted strategy**
- **Disrupt mobilization process**
- **Work through third party moderates**
- **Infiltrate the cellular network structure**

Demographics point to a major change



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The barriers to affordable solutions are often technical

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- Information technology
- Software
- Manufacturability
- Biotechnology

But, it is also the people, stupid!
or
Is it stupid people?



Kinetic weapon needs against hard targets

- Physical destruction of HDBT with penetrating weapons
 - RNEP
 - Multiple, large conventional bombs.
 - Large Kinetic Energy impactors/rods/jets
- Reliable smart fuses for fast penetrators
- Functional defeat with exquisite intelligence (persistent, ubiquitous, all weather ISR) for location, characterization, and BDA.
- Chem and bio weapons defeat with radiation and long duration high temp



Kinetic weapons against soft fixed & relocatable targets needs

- Smarter weapons that understand location, status, effects, and communicate for real time connectivity and BDA could be developed
- Precision delivered hypersonic masses, rods, and flechetts offer the potential for high lethality and low collateral damage
- Sensor controlled and multimode munitions
- Pre-deployed on-site sensors or short range weapons for precision strike and rapid response eg: UGS, NETFIRE, SOF
- **Perch, search, lurch**

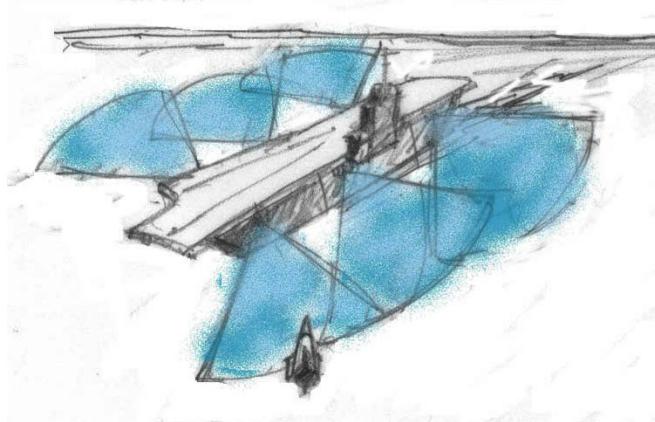


Will military application of beams ever be real?

- Speed of light weapons including lasers, HPM, & particle beams, non-lethal weapons



HPM



Proton Shield



Sensory overload
from combined effects



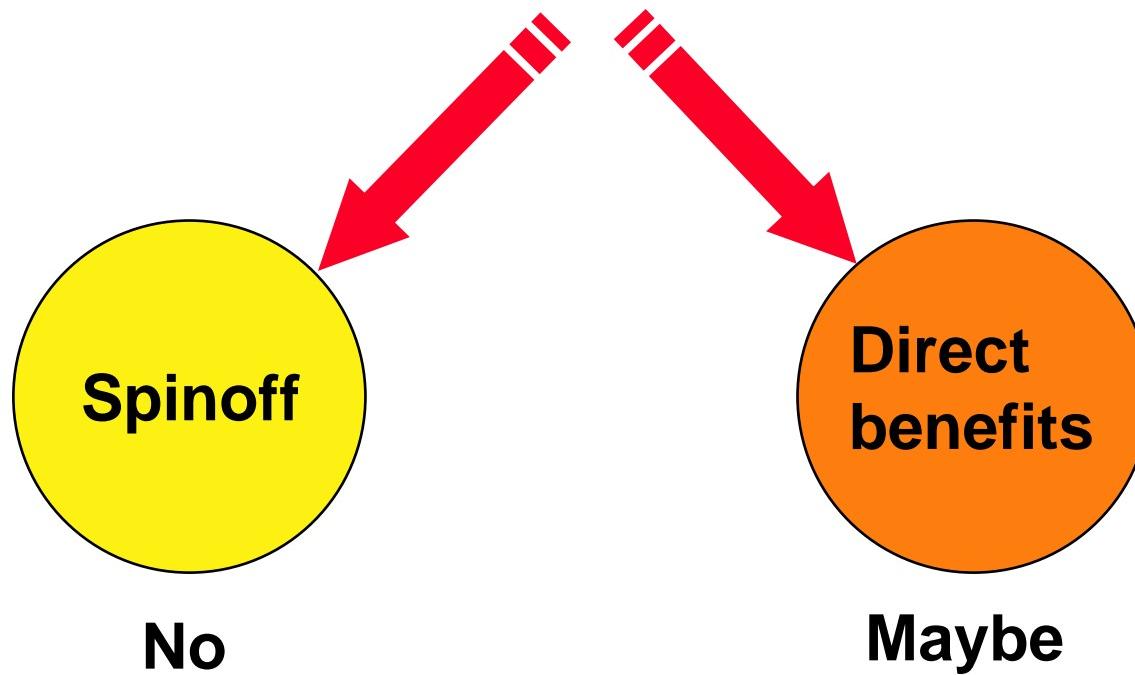
Summary of needs

- Nuclear and non-nuclear penetrators
- Diggers/sensors for underground warfare
- Brilliant weapons/location, status, effects, comm, BDA
- Agent defeat weapons
- Info ops/functional kill/asymmetric war
- Non lethal weapons



Role of National Labs?

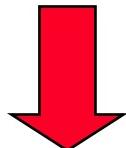
- Affordable benefits?
- Relevance, timely, cost effective?





More C³ needed for relevance

- Consolidate to sustain and enhance competencies
- Cooperate on shared problems
- Compete for applications

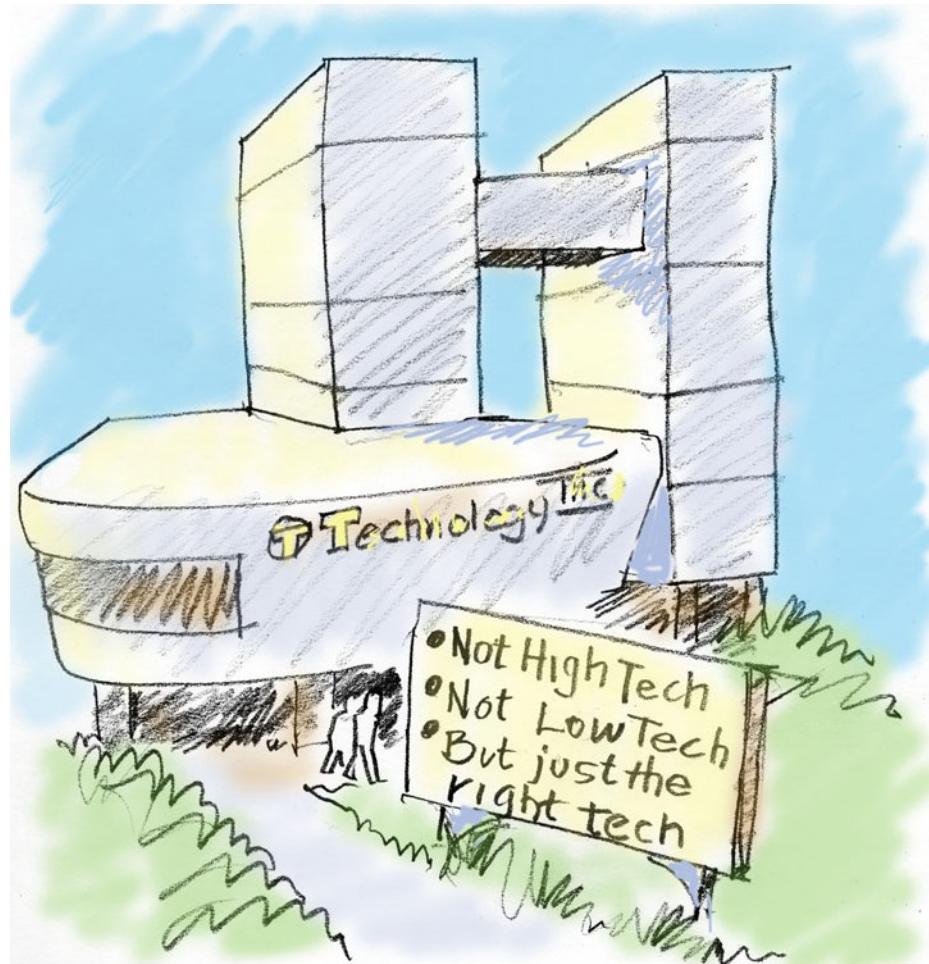


- The key to relevance is rapid application of the right tech

Research → Development → Application



The right tech





Role of National Labs

- Accelerate solution realization
- Share cost and risk
- Enhance critical capabilities
- Provide focus
- Integrate biological,social, and physical sciences in system solutions

Catalyze interdisciplinary teams for system solutions

Government - Universities - Industry - Lab - Teams

GUILT



Conclusion

- The rate of political, economic, social, tech change is increasing
- The driving forces for solutions are inescapable
- Advances in technology can be part of the solution
- Rapid/agile/relevant deployment of solutions is essential
- GUILT offer a way to speed and affordability

Prepare for inevitable surprises